



March 22, 1994

*J.G. for*  
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TO: M. M. Lwin/W. Whitney  
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RE: SR-167, OL-1511A, CS 1766  
15th St. SW to S. Grady Way  
Bridges #167/121 through #167/128  
Supplemental Drilled Shaft Recommendations

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As promised in our February 24, 1994 memorandum, we are providing supplemental recommendations for the drilled shafts, including construction considerations and an advisory specification for inclusion into the drilled shaft general special provision.

Based on our conversations with the structural design consultants, ABKJ Inc. and Sverdrup, Inc., we understand the drilled shafts will only be used on the interior piers. The shafts will be 4 feet in diameter and will range from approximately 60 to 80 feet in depth. Bridge 167/121 is expected to use 5-foot shafts extending to approximately 90 feet in depth. The design depths were selected on the basis of our February 24 memorandum. All of these shafts are expected to extend below the bottom of the adjacent pile tips. The lateral offset from the edge of the new shafts to the existing piles are expected to range from approximately 7 to 15 feet. As indicated in the geotechnical report by Terra Associates, very loose sand and silt are present near the surface at all bridge sites. Interbedded dense, medium dense and occasionally loose sand layers are also present at depth.

There are two primary construction concerns related to the factors described above: 1) the potential for sands to run during excavation, resulting in loss of ground beneath the existing foundations and 2) the possibility of concrete flowing out into the very loose upper soils during casing extraction, resulting in an unusable shaft. To mitigate the risk of damage to the existing piers, we therefore recommend that casing be required for all shafts on this project as indicated in the table on page 2. The permanent casings required at Pier 2 of Bridge #167/123 and all shafts of Bridge #167/128 are intended to prevent loss of concrete into the surrounding soils.

### Summary of Shaft Casing Requirements

Bridge Number	Casing Type	Minimum Depth (feet)
167/121	Temporary	75
167/122	Temporary	50
167/123 Pier 2 Pier 3	Permanent Temporary	Full Depth 25
167/124	Temporary	30
167/125	Temporary	35
167/126	Temporary	65
167/127	Temporary	30
167/128	Permanent	Full Depth

To minimize the potential for running sands, excavation of soil must not extend beyond the bottom of the casings, unless a drilling slurry or other means is used to maintain hole stability. Excavation below the casing bottom must be held to the minimum necessary to allow advancement of the casing. The attached advisory specification describes this requirement and should be inserted into section 1.01A of the SHAFT general special provision.

Should you have any questions related to this project, please contact Henry Gertje at 664-8229 or Tony Allen at 586-7088.

RGF:hg

HG

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## **Advisory Specification for Drilled Shaft Construction**

During construction of drilled shafts, the Contractor should anticipate excavating below the water table through very loose to dense granular soils. Caving soil conditions should be expected, and therefore any excavation extending below the shaft casings will require the use of slurry or other methods developed by the Contractor. The Contractor is strongly advised to review the geotechnical report, memorandums and all subsurface data available for this project.